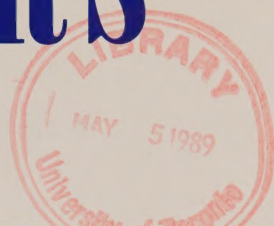


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CONSUMER'S GUIDE



To Buying Energy-Efficient Resale Homes




Ontario

Energy leadership

For economic strength

Ministry
of
Energy

Robert C. Wong
Minister



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Introduction

Buying a house will likely be one of the largest expenditures you ever make. Potential home buyers often find themselves performing a balancing act, considering many different issues. These include the house price, location, features, and energy efficiency.

The Energy Factor

This booklet provides valuable information to help you determine whether a house is energy-efficient – or what is required to make it energy-efficient.

Focusing specifically on resale (as opposed to new) homes, it shows you how to identify the features that make a home energy-efficient. The checklist at the back of this booklet will help you do a quick “energy walk-through”.

The booklet will also let you determine simple and inexpensive energy improvements, as well as the potential for even greater improvements through major renovations and repairs. Finally, it provides sources of further information on all the topics covered.



Similar looking houses can have very different fuel bills.

The Benefits of an Energy-Efficient Home

The energy profile of a home directly affects its comfort, affordability, and the security of your investment.

Comfort

Energy-efficient homes are well insulated and well sealed against air leakage, making them draft-free, warmer, and quieter than other homes. They will also likely have less dust and more even temperatures. That all adds up to increased comfort and satisfaction for you and your family.

Affordability

Space heating and other energy costs are significantly lower in energy-efficient homes than in inefficient dwellings. That means you may be able to afford a higher-priced home than would otherwise be possible (see *Carrying Costs – The Energy Factor*).

Security

Your energy-efficient home will provide a degree of protection against inflation and fluctuating energy prices. It may also offer better resale value when energy prices rise.



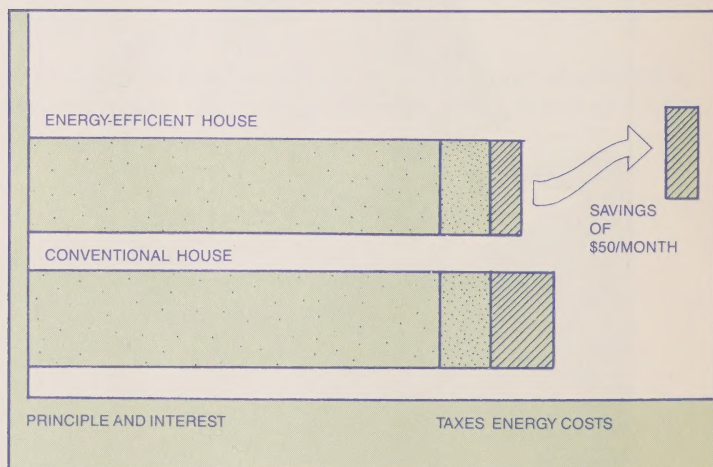
A warm, draft-free house is a comfortable house.

Carrying Costs – The Energy Factor

Energy-efficient homes cost less to live in. With this in mind, many financial institutions now take energy costs into consideration when approving mortgages.

Traditionally, banks and trust companies have added up the monthly mortgage Principal and Interest costs and Taxes (called the “PIT” formula) to determine whether a family could afford a specific house. However, since energy costs are now recognized as a major household expense, lenders are increasingly using the “PITE” formula, with the “E” representing Energy costs. In some cases, as demonstrated by the chart on this page, this means that buyers can afford a home with a higher initial purchase price.

In this example for an energy-efficient home, the energy savings are estimated at 50% or \$600/year. This can be used to either lower operating expenses or pay for a \$5,400 higher mortgage. This example assumes yearly taxes of \$1,000 (\$83/month) and a \$70,000 mortgage (\$650/month principle and interest @ 10 1/2%).



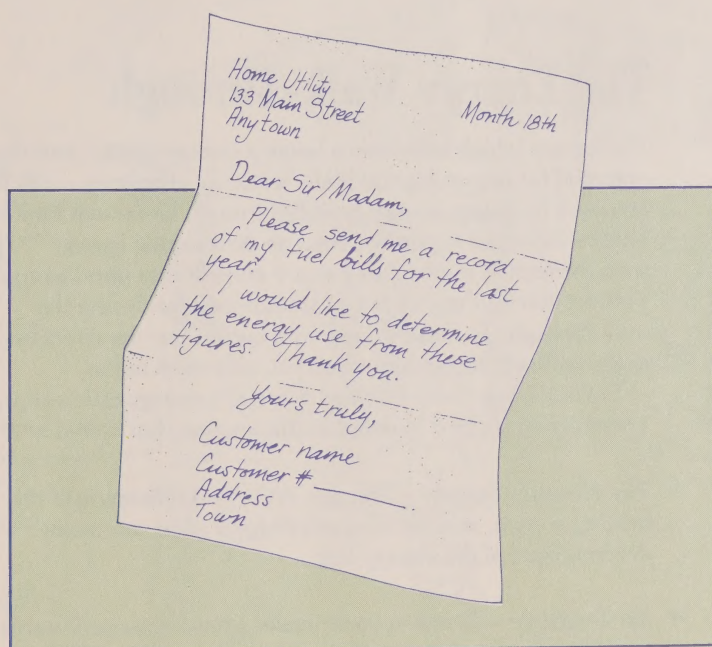
Carrying Costs – The Energy Factor.

Energy Bills

You can use the “E” part of the “PITE” formula – the energy costs – as a starting point for comparing the energy efficiency of different homes. Two houses that appear to be similar can have very different energy costs – as much as \$500 difference a year or more.

The total annual energy costs for a home include the bills for space and water heating, as well as electricity for lights and appliances. Many homeowners and realtors willingly provide energy bills from the previous year as a selling tool for a house. If this information is not readily available, the seller can obtain it by writing directly to the utility or fuel supplier.

It is important to get the bills for all types of energy (including electricity, fuel oil, natural gas, propane, and wood), since some homes use more than one fuel for heating. Some fuel consumption – like wood – will be more difficult to determine and an estimate may have to be made.



A request from the homeowner for the fuel bills.

Interpreting the Information

Comparing energy bills between houses will obviously indicate which house has the lowest energy cost. However, this cost will be a function of many things, including the type of heating system, the lifestyle of its occupants, and the energy-efficient features of the house.

Knowing the energy bills will help you budget the cost of running a house. Energy improvements can be made in most houses, so the energy bill should be regarded only as a starting point for comparison purposes. If you want to make a rough comparison of the energy efficiency of different sized houses that use the same energy type, simply divide the total annual energy bill by the total square metres (or square feet) of the house. This will give you the energy cost per square metre (or square foot) for each house.

The Energy Walk-Through

The factors which influence a home's energy costs – and the potential for improving the home's energy efficiency – can be assessed by doing an energy walk-through. Even with limited time or technical expertise, you can do a simple energy walk-through of the houses you are considering purchasing. This section outlines what you should look for during the walk-through. To make things even easier, use the checklist at the back of this booklet when you visit each home.

Several basic features affect a house's energy efficiency. These are described in detail in this section, but include:

- **The Heating System** – The age, type, and efficiency of the heating system, and the kind of energy it uses, are major determinants of the energy bill.
- **Air Leakage** – Drafts not only make a house uncomfortable, they increase heating as well as air conditioning costs and can cause moisture damage.

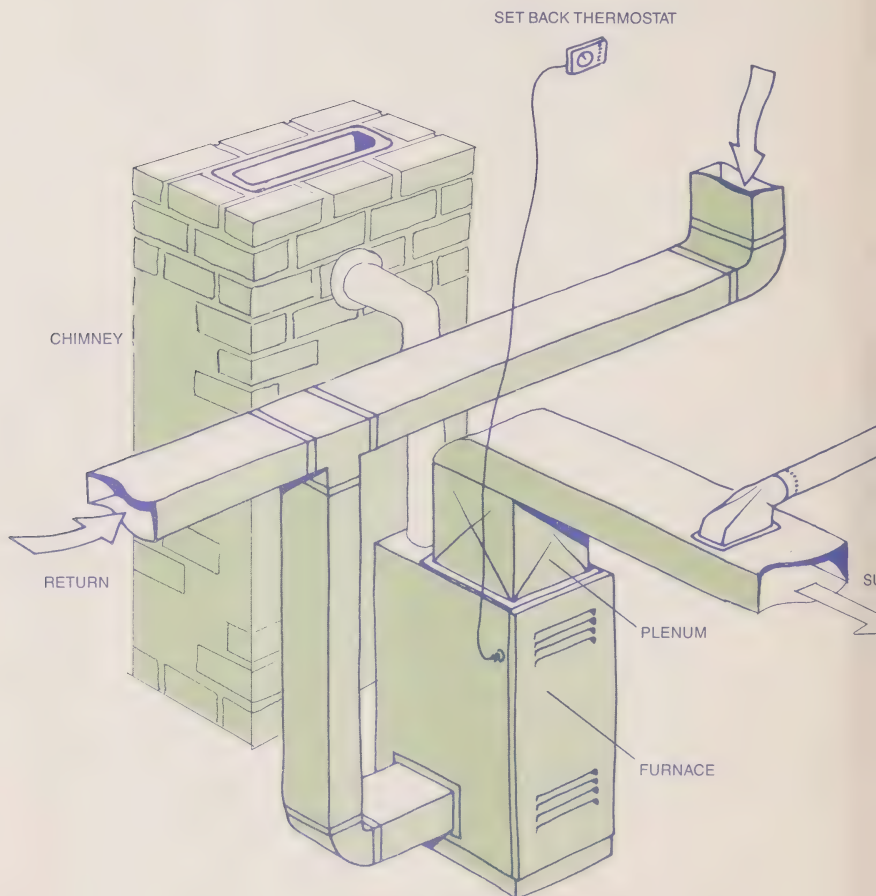


- **Insulation** – The amount and type of insulation determines its RSI(R) value. The higher the RSI(R) value, the better the insulation restricts heat loss.
- **Windows and Doors** – The type and condition of windows and doors affect both the comfort and energy costs of the home.
- **Lifestyle Differences** – The lifestyle of the family living in the home will be reflected in the energy bill.



The Heating System

It is important to know the age of the heating system to determine if it will have to be replaced in the near future. Furnaces generally last from 15 to 20 years, while boilers can last for 25 years or longer. Replacing an old, very inefficient system with a new, higher efficiency model can improve efficiency by as much as 50 per cent.



Forced air oil- or gas-fired heating system.

There are many options for distributing heat through a house. Central forced air or hot water systems are the most common, but some systems – such as electric baseboards and radiant panels hidden in the ceiling – are installed in each room. Only systems with ducts can be used for central air conditioning.

Oil- or gas-fired heating systems require regular servicing – annually for oil, and every two years for gas. Look for a sticker from the service company indicating servicing dates.

The chimney is an important part of any gas- or oil-fueled heating system. For safety reasons, the chimney should be in good condition both on the outside (no staining, damaged bricks, or loose mortar) and the inside (unobstructed). A new chimney liner is needed if the existing one is in poor condition. It may also be required if the heating system is being replaced. Check with your local utility or building department for regulations.

BRANCH
DUCT



Heating with Wood

If the house uses wood as the primary or secondary heating fuel, check the system for energy-efficient features. Wood furnaces, wood stoves, and fireplace inserts should be airtight and certified by an approved testing agency, such as the Canadian Standards Association (CSA) or Underwriters Laboratories of Canada (ULC). Check with your insurance company to determine whether a wood stove will affect your policy rates.

Fireplaces are not efficient and should not be considered a source of heat. For best performance, they should have tight-fitting glass doors (most aren't) and a fresh air intake.

When moving into your new house, it is important to have any fireplace or wood stove inspected and the chimney cleaned before using it for the first time.

Doing the Work

A complete tune-up of the heating system is always a good investment. This work, and the assessment of your replacement options if the system is old, should always be done by a qualified contractor.

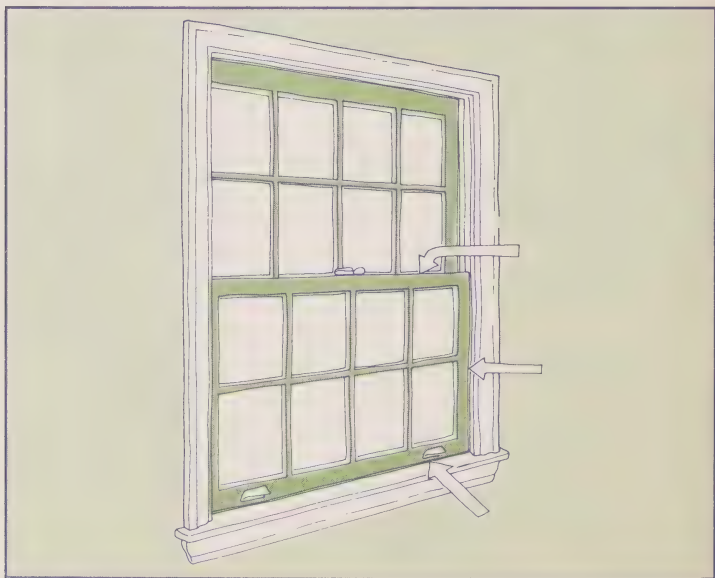
Air Leakage

Air leakage usually accounts for between 20 and 30 per cent of a home's heat loss. It may also carry damaging moisture into walls and attics, and is responsible for uncomfortable drafts. A carefully sealed house can save up to 20 per cent on heating costs compared to a similar-sized, poorly sealed home – and it will be more comfortable too.

What to Look For

Windows and doors should have weatherstripping around all moveable joints. The weatherstripping should be continuous, flexible, and tight sealing.

Trim around windows, doors, and baseboards should be caulked. If you feel air movement with the back of your hand, this means there are large gaps and heated household air is escaping while cold outside air is entering the home. Penetrations through the wall, such as water pipes, vent ducts, and electrical outlets, should also be sealed.

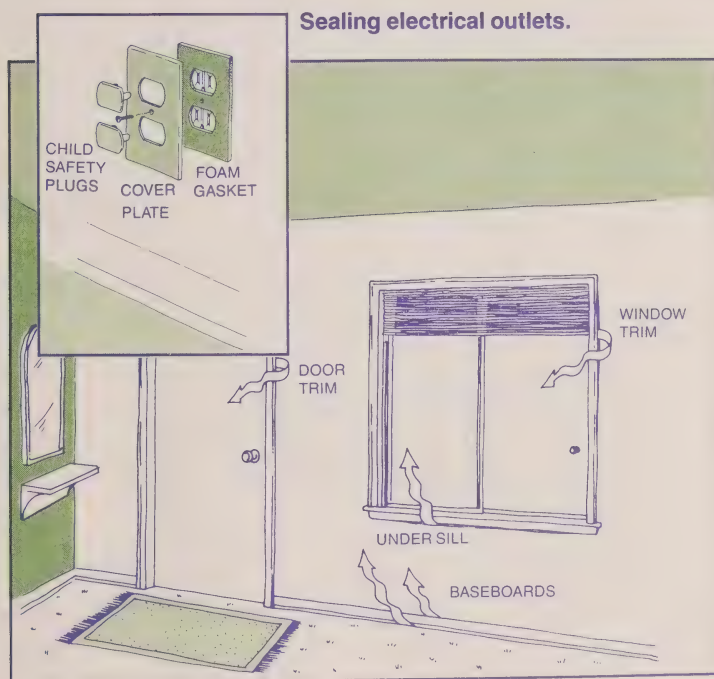


Window weatherstripping locations.

While air leakage should be minimized, the house should also have good ventilation, capable of exhausting stale air and excess humidity. Look for exhaust fans in the kitchen and bathrooms (these should be vented to the outside). Moisture problems, such as staining on walls and ceilings and mildew or mustiness are signs of inadequate or poorly used ventilation.

Doing the Work

In most cases, you can do a good air sealing job yourself with about \$150 worth of caulking, weatherstripping, and other materials. Air sealing companies can often do a better job using specialized tools, materials, and skills. The cost will range from \$500 up, depending on the house. Look for these companies in your *Yellow Pages* under *Energy Conservation Consultants* or *Insulation Contractors*.



Gaps around trim and baseboards.

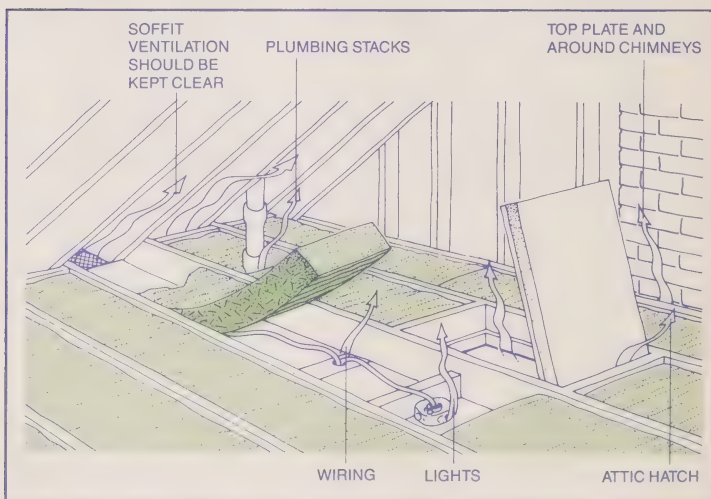
Insulation

Air sealing and heating systems generally play a more important role than insulation in determining a home's energy efficiency. Many houses are already insulated to the extent that it may not be practical (or even possible) to add more insulation. However, there are some notable exceptions, and the following guide will help you assess the insulation level and potential of a given house.

What to Look For – Ceilings and Attics

Attics should have at least RSI 5.4 (R32) or about 250 mm (10 in.) of insulation. If there is less than RSI 3.5 (R20) or about 150 mm (6 in.), it will be worthwhile putting more in. Hard-to-get-at locations, such as cathedral ceilings, knee-walls, and around dormers, should also be insulated.

Air leakage paths from the house into the attic should also be sealed to stop the flow of heat and moisture. Combined with adequate attic ventilation, this should prevent condensation damage. Ideally, half the ventilation should be in the soffits, and the other half high on the roof.



Typical air leakage paths in attic.

Walls

Outside wall cavities should be filled with insulation if they are constructed with wood studs and have a cavity that is at least 89 mm (3.5 in.) thick. You may be able to check for the presence of insulation by looking behind an electrical outlet plate. Before doing this, ensure that power to the outlet is disconnected. If the cavity is only partially filled, it is usually not cost-effective to add more insulation.

Cavities in double brick walls should never be insulated; they are too small to make it worthwhile, and insulation would interfere with the important drainage function of these spaces. If you are uncertain about the type of wall construction, ask the realtor.

Basements and Crawl Spaces

Basements and crawl spaces are traditionally neglected areas, even though they can account for up to 30 per cent of a home's heat loss. Since 1974, the Ontario Building Code has required that all new homes have partial-depth basement insulation.

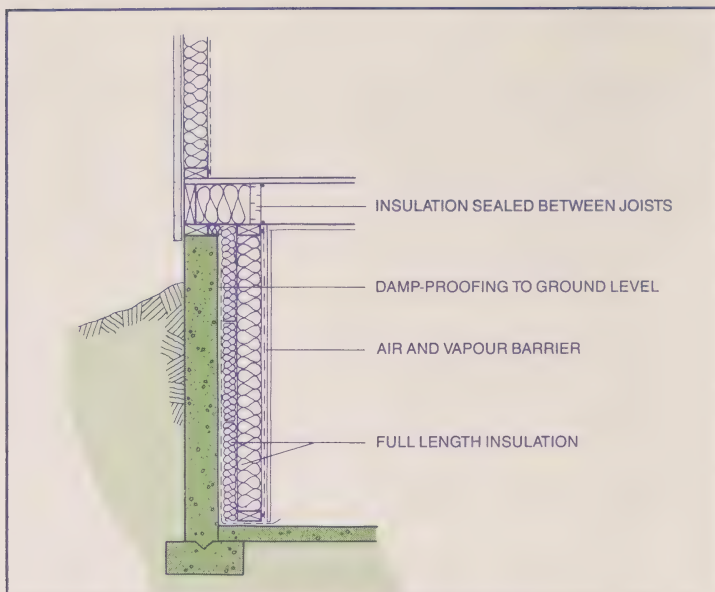
Basement walls can be insulated either from the inside or the outside. If there are moisture problems, insulation should be installed on the **outside**. Ideally, the insulation should extend the full height of the foundation wall.

Older brick or rubble (fieldstone) foundations should be insulated on the outside only, after damp-proofing, to avoid possible structural problems.

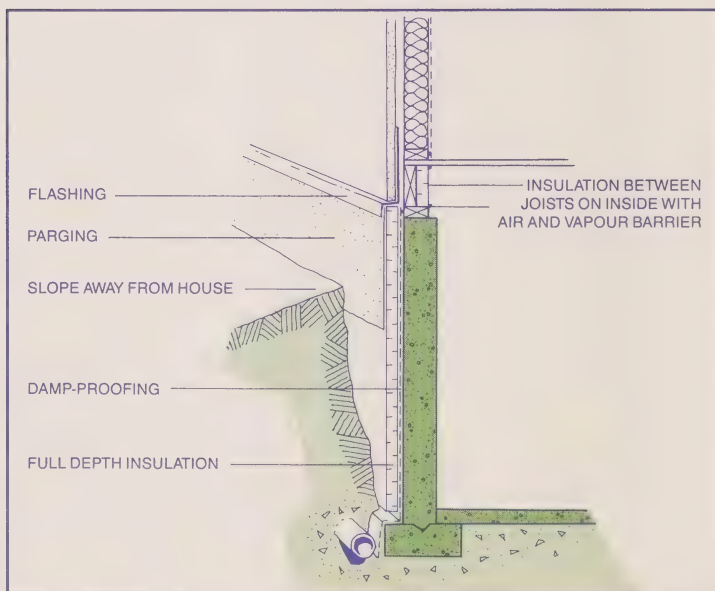
There are two basic approaches to insulating crawl spaces – insulation can be installed between the floor joists, or the walls surrounding the crawl space can be insulated. The latter is recommended, since it provides a warm crawl space where ducts and piping can be routed without having to be insulated. There is usually less area to insulate with this approach.

Doing the Work

Attic and interior basement insulation can make good do-it-yourself projects. Wall insulation is usually blown in by an insulation contractor.



Interior basement insulation.



Exterior basement insulation.

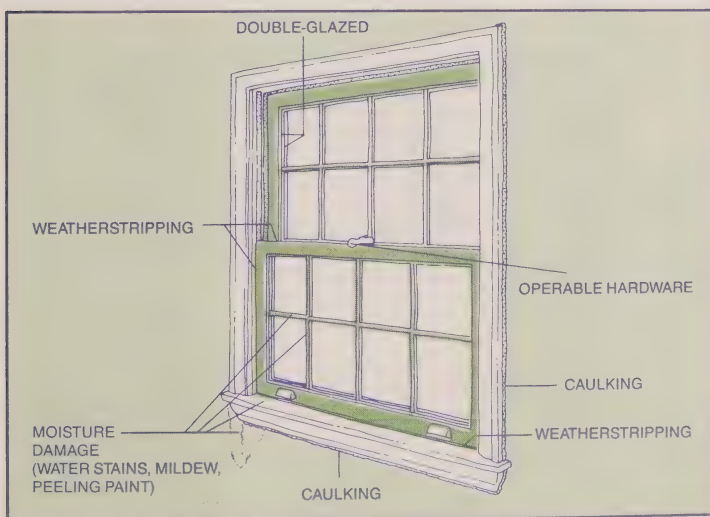
Windows and Doors

Windows can be a prime source of uncomfortable, heat-robbing drafts. In most cases, inefficient windows can be easily upgraded. However, if they are in poor condition and difficult to repair, it might be better to replace them.

What to Look For

Windows and doors should be air-sealed with caulking (at non-moveable joints) and weatherstripping (at moveable joints). The window type is also important – sliding windows are generally harder to seal than windows that swing, such as casement and awning styles. There should be at least two panes of glass in each window. If the window has only one pane of glass, interior or exterior storm windows should be added.

Check the frame and the sill for water damage and signs of rot. If the unit is beyond repair, you will have to budget for new windows. Replacing all the windows in a house can cost several thousand dollars. Consider buying higher efficiency units. If the doors are also in poor condition, insulated doors with good weatherstripping are available.



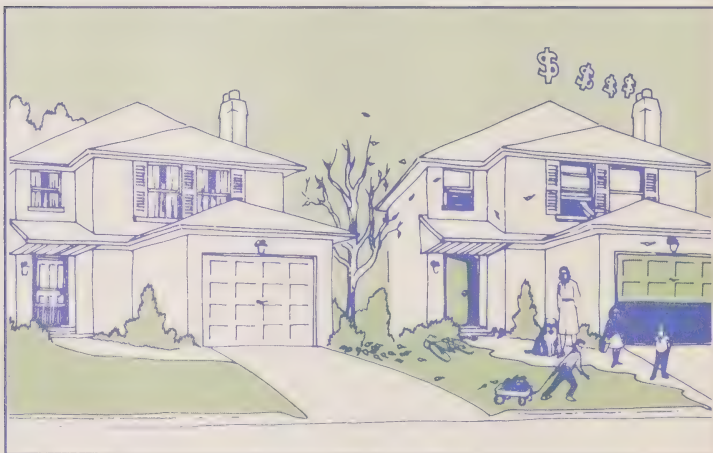
What to look for in a window.

Lifestyle Differences

Lifestyle factors that differ from family to family may also affect the rate of energy use in the home. These include:

- The number of people in the family – a larger family will use more hot water, for example.
- How many people are home during the day – heating bills tend to be higher when there is someone at home throughout the day.
- The thermostat settings – a maximum setting of 20°C (68°F) is generally recommended. Infants and elderly people may require warmer temperatures. At night, and when no one is home during the day, the setting can be much lower – 17°C (63°F).
- Long periods of vacancy (for example, during winter vacations).
- The use of air-conditioning.
- The number and use of different appliances.
- Lifestyle habits, such as keeping windows open year-round.

While it is difficult to determine and measure the impact of these lifestyle factors, you should be able to establish whether your energy bills are likely to be higher, lower, or substantially the same as those of the previous owners. Take into account your own lifestyle before assessing energy use in any prospective new home.



Lifestyle differences between families can dramatically affect the energy bill.

Energy-Efficient Renovation and Repair Opportunities

During your walk-through, you may identify a need for renovations or repairs. This could range from simple redecorating – a paint job and some new curtains – to a major kitchen renovation or the addition of an extra room.

When you are considering buying a house that requires work, keep in mind that energy efficiency can be incorporated into virtually every renovation activity. In fact, renovations and repairs may provide an ideal opportunity to make the house more energy-efficient.

Whatever activity you undertake, the general principles for an energy-efficient renovation remain the same:

- Use the opportunity to make the house more air-tight. This will save energy, improve comfort, and protect the structure from moisture damage.
- Whenever outside walls of the house are exposed, add insulation. Both an air and vapour barrier are required to protect the insulation and building from moisture. These functions can be combined in one material (such as sealed polyethylene sheets) or be separate (for example, sealed drywall and vapour barrier paint).
- Do the work properly, so that your efforts to improve the energy efficiency of your home are not wasted. For further advice on energy-efficient home improvements, see “For More Information” at the back of this booklet.

Refinishing

Preparing your new home for re-painting provides an ideal opportunity to seal air leaks. Seal gaps around window and door trim and baseboards. If possible, remove the trim or baseboard and seal the wall behind it. This is especially effective if you can expose the window and door framing.

Choose the right paint – oil-based or a special latex undercoat – to provide an effective vapour barrier on the inside surface of exterior walls and ceilings.

Window Replacement

If you plan to purchase new windows, look for more efficient units. Major renovation projects may provide an opportunity to change the size of the windows; larger south-facing windows and smaller north-facing windows will make the house more energy-efficient. For help in selecting energy-efficient windows, refer to “For More Information” at the back of this booklet.

Kitchens and Bathrooms

It is difficult to properly air-seal and insulate kitchens and bathrooms except during major renovations; cupboards, counters, sinks, and bathtubs get in the way. However, when these obstructions are removed or replaced, you can install extra insulation and a continuous air and vapour barrier. Ensure that all plumbing is on the warm side of the insulation.

Attic Renovation

Creating living space in an unfinished attic is a popular renovation activity. New insulation and a continuous air and vapour barrier can make the attic a warm and secure area. If the attic has sloped ceilings, the rafters can be extended or strapped to provide the needed space for insulation and ventilation.

Basement Finishing

Turning a poorly used basement into a livable space is a project that many do-it-yourselfers undertake at some point. Before you begin, check the walls for cracks or leaks and resolve these problems immediately. The walls should be damp-proofed from the floor to ground level before installing floor-to-ceiling insulation and an air and vapour barrier.

If you are digging out a basement to get more headroom, you may want to consider installing under-the-floor insulation for greater comfort (although the floor will be warmer, the energy savings will not be great).

Basement Excavations

If you are excavating outside your home to repair the foundation, fix leaks, or apply damp-proofing, you can add insulation at the same time. Ideally, the insulation should extend down to the footings.

Re-siding

If your plans include new siding, take the opportunity to add insulation to the walls. Make sure the exterior insulation is installed according to the manufacturer's instructions.

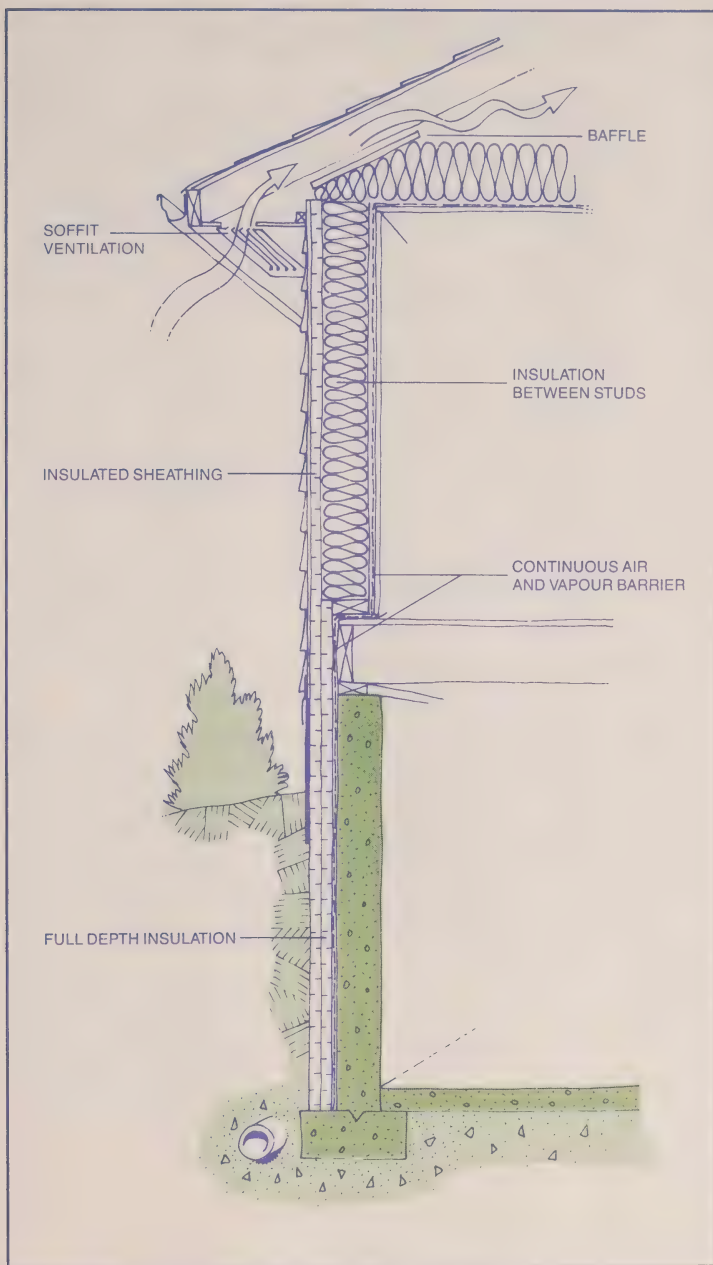
Transformations

Some consumers purchase resale homes with the intention of doing major work, such as building an addition, adding a second storey, or completely gutting the interior. This kind of renovation closely resembles new construction techniques, enabling you to add high levels of insulation without being restricted by existing features.

Major home transformation projects also allow you to install a continuous air and vapour barrier from room to room and even between floors. A complete energy-efficient retrofit can reduce heating bills by more than 50 per cent, although most renovations are not this extensive. A major transformation creates a very different house, and the implications should be carefully examined.

For example, the home's mechanical systems – heating and ventilation – will be affected. Because of the greatly reduced heating load, a new, smaller heating system will be required. The heat distribution system will also have to be rebalanced.

Your transformed home will also be very air-tight, meaning that fresh ventilation air will have to be distributed throughout the house. This is often done with heat recovery ventilators that can recover 75 per cent of the heat from outgoing household air. Air must also be provided to all combustion appliances; better yet, install more efficient furnaces and water heaters that require little or no combustion air from the house.



Energy-efficient addition.

For More Information

This booklet is one of a series of free publications aimed at helping consumers make informed decisions about home energy matters. Other booklets in this series include the *Consumer's Guide to Buying Energy-Efficient Windows and Doors* and *Consumer's Guide to Buying Energy-Efficient Appliances and Lighting*.

The Ontario Ministry of Energy also publishes the following booklets:

Where and How to:

- *Caulk and Weatherstrip*
- *Install Air-Vapour Retarders*
- *Insulate Basements*
- *Provide Fresh Air and Control Humidity
in a Tighter House*
- *Insulate Cathedral Ceilings and Flat Roofs*
- *Improve Fireplace Efficiency*

*An Old Flame Rekindled –
A Guide to Residential Wood Heating.*

For free copies of these booklets, write to:

Ontario Ministry of Energy
Consumer Publications
56 Wellesley Street West, 9th Floor
Toronto, Ontario M7A 2B7
Telephone in Toronto: 965-3246.
Outside Toronto: call toll-free, Zenith 80420.

The Ontario Ministry of Housing has produced a series of factsheets and booklets on home renovation matters. These include:

- *Understanding Your House*
- *The Water Resistant House*
- *Plans, Permits & Payments: Home Renovations and Improvements*
- *Get Your House In Shape*
- *Plumbing: Getting Water Where You Want It*
- *Wiring: Putting Power at Your Fingertips.*

These are available free from either:

Housing Conservation Unit
Ministry of Housing
777 Bay Street, 2nd Floor
Toronto, Ontario M5G 2E5
(416) 585-6514

or:

Ontario Renovation Information Centre
16 Howland Road
Toronto, Ontario M4K 2Z6
(416) 461-7577.

Other home renovation and construction publications are available from the Canada Mortgage and Housing Corporation (CMHC), including:

- *Canadian Wood-Frame House Construction*
- *The Sensible Rehabilitation of Older Homes*
- *New Life For An Old House*
- *Home Care.*

To obtain your copies, write to:

CMHC Publications
Canada Mortgage and Housing Corporation
682 Montreal Road
Ottawa, Ontario K1A 0P7.

Energy, Mines and Resources Canada also publishes factsheets and booklets on various aspects of home energy management, including:

- *Keeping The Heat In* (a comprehensive book on home energy retrofit)
- Booklets on home heating
- *Natural Gas*
- *Electricity*
- *Oil*
- *Wood*
- *Solar Water Heat.*

A series of 20 Enerfacts factsheets, including:

- *Weatherstripping*
- *Caulking*
- *Attic Ventilation*
- *How to Detect and Seal Air Leaks*
- *Windows*
- *How's Your House* (a self-scoring home assessment quiz).

These and other titles are available from:

Home Energy Information
Energy, Mines and Resources Canada
580 Booth Street
Ottawa, Ontario K1A 0E4.

Energy Walk-Through Checklist

(First House)

Location _____

Size sq. m (sq. ft.) _____

Annual Energy Bills:

_____ Electricity

_____ Gas

_____ Oil

_____ Other

_____ TOTAL

Heating System

Age _____

☐ Forced Air ☐ Hydronic ☐ Baseboard ☐ Other

☐ Furnace/boiler needs upgrading or replacement to a more energy-efficient system.

Air Sealing

☐ Windows and doors require weatherstripping.

☐ Window and door trim and baseboards require caulking.

☐ Other areas require sealing.

☐ Kitchen and bathrooms vent to the outside.

Energy Walk-Through Checklist

This checklist provides you with a simple means of evaluating a home's energy efficiency. To compare homes, photocopy the checklist.

Establish the Energy Bill

There is space to record the annual energy bill for the house. This will let you budget more accurately when comparing one house with another and will result in fewer surprises when you move in.

Determine the Energy Efficiency Potential

The information in the other panels will help you identify the existing energy-efficient features of the house and its potential for improvement.

A Plan for Action

Once a deal is closed, this checklist can be used as a worklist for improving the energy efficiency of your new home.

Insulation

- ☐ Wall insulation can be added (empty wall cavity).
- ☐ Attic insulation is less than RSI 3.5 (R20) or 150 mm (6 in.) and can be topped up.
- ☐ Basement insulation can be added from exterior or interior.

Windows and Doors

Number of windows need extra glazing. _____

Number of windows need replacing. _____

Number of doors need to be replaced. _____

Lifestyle Differences

Number of people in family. _____

- ☐ Someone is usually home throughout the day.
- ☐ Thermostat is normally set above 20°C (68°F).

Renovation/Repair Needs

- ☐ Redecorating is planned: will do air sealing and add insulation.
- ☐ Repairs are needed: will do air sealing and add insulation.
- ☐ Conversions are planned: will do air sealing and add insulation.
- ☐ Major renovation is planned: will make house very energy-efficient.

This publication was produced in collaboration with Energy,
Mines and Resources Canada.

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Association for their assistance.

Cette publication et d'autres publications sur l'efficacité
énergétique des habitations sont disponibles en français.
Pour des exemplaires, communiquez avec le ministère de
l'Énergie de l'Ontario:

Publications destinées aux consommateurs
56, rue Wellesley ouest, 9^e étage
Toronto (Ontario) M7A 2B7.

À Toronto, au (416) 965-3246.

À l'extérieur de Toronto, appelez le téléphoniste sans frais et
demandez Zénith 80420.